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**From:** Peterson, Erik  
**To:** Helder, Dirk; Fleming, Sheila; Allen, Elizabeth; Henning, Alan  
**CC:** Wu, Jennifer  
**Sent:** 4/27/2015 8:32:23 PM  
**Subject:** RE: Scientific basis for pesticide-free buffer zones

Thank you for the quick and useful responses. Including all the way to micro-encapsulation. And, the soil fumigant online buffer calculator. Those are great examples of how EPA is dealing with related issues. Also interesting that Elizabeth may have spoken with Justin at OHA recently.

It doesn't sound to me like there is an EPA approved annotated bibliography of research on pesticide buffer zones for aerial application of forestry pesticides near residences.

Without an existing EPA product, the question becomes what do we know as a group of professionals. Based on your responses, it doesn't appear to me that we as a group here in Region 10 have an immediate list of references which we think are relevant. It would take some work to produce.

Given that there is no established EPA answer to his question, and I don't think we are able in the immediate near term to do a custom search for related references, I propose that one of us calls Justin. Based on my early conversation with him, I think he already has spoken with several people in EPA. Including Elizabeth? I don't think he has spoken with Dirk, and I think Dirk may have the closest sense of how to provide Justin a description of the research that either exists or is likely to exist and where it may be found. Or, any other suggestions? And, Dirk are you open to calling Justin?

Another point I'll make is that I remember Justin saying that he had done some work contacting other states and asking them for the scientific basis for their buffers for residences. He was not successful. I wonder if a deeper dive into why Washington has a 200 foot buffer for aerial application of forestry herbicides around residences, Idaho a ½ mile buffer, and the BLM in eastern Oregon a ¼ mile buffer might be fruitful. Surely Washington, Idaho, and the BLM chose their buffer widths based on some specific information.

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**From:** Helder, Dirk  
**Sent:** Monday, April 27, 2015 11:53 AM  
**To:** Peterson, Erik; Fleming, Sheila; Allen, Elizabeth; Henning, Alan  
**Cc:** Wu, Jennifer  
**Subject:** RE: Scientific basis for pesticide-free buffer zones

All,

Yes there is no short answer, nor is there a correct answer. Buffers around people's home could be based on many different things: the toxicity of the product and how the product is applied and weather conditions at the time of application. The primary concern is from drift or volatilization and that can travel large distances under the right circumstances. I was the Team Leader for OPP's reevaluation of metam sodium which is a pesticide applied as a liquid but it volatilizes in the soil and we had exposure incidents up to 2 miles away. As part of the reevaluation process we developed an online buffer zone calculator that the applicator must fill out prior to the application. This was by far the most advanced risk mitigation we had ever attempted and required a high degree of planning and weather analysis

prior to the application. The buffer zone calculator used information based on the toxicity of the pesticide, application method, soil temperature and a few others to calculate a buffer distance around the treated field in which no other workers could be, no residences, businesses could be. The buffer was an exclusion zone. It did not consider wind speed or wind direction because we know those things change. We had NOAA weather data from about 50 years from major metam sodium uses areas across the country that was input in the model. One of the things we were most concerned with was "no wind" scenarios where the product would volatilize and build up and then a big cloud of it would move offsite in the early morning hours when the winds begin to blow.

<http://ofmpub.epa.gov/apex/pesticides/f?p=125:1:0::::>

I don't have any great suggestions for this issue, but it seems like you could take the local weather data and local topography and develop an air dispersion model that could include the toxicity of the ten most commonly used products. The Office of Air likely has something that might be useful. But, there are a lot of factors that come into this: toxicity of the product, wind speed, direction, terrain, release height, nozzle type, droplet size, product type, use of surfactants. It is very complicated but could be solved. We worked as a team of about 40 of us from EPA on 6 soil fumigant pesticides for about 8 years...

I wonder if there are any granular products that could be useful for weed control efforts in close proximity to homes. There is virtually no drift and exposure could be greatly reduced. I doubt they are as effective in this setting but they could be a consideration. Also, I think there could be some efforts to engage with the pesticide manufacturers to help solve this issue. I know there are a number of risky pesticides that have been microencapsulated as liquid products. The active ingredient is applied safely to the ground to eliminate drift and as the microencapsulation breaks down the product is released into the soil to control the pest. Both liquids and solids can be microencapsulated to ensure they reach the target site...

<http://www.ecosafenatural.com/about-us/formulation-capability/microencapsulations/>

<http://pubs.acs.org/doi/abs/10.1021/bk-1977-0053.ch012>

Best,  
Dirk Helder  
US EPA  
(208) 378-5749

**From:** Peterson, Erik  
**Sent:** Monday, April 27, 2015 12:02 PM  
**To:** Fleming, Sheila; Allen, Elizabeth; Henning, Alan; Helder, Dirk  
**Cc:** Wu, Jennifer  
**Subject:** RE: Scientific basis for pesticide-free buffer zones

Sheila, Elizabeth, Alan and Dirk,

I am writing with the hope of identifying the appropriate person to follow-up on a question from the Oregon Health Authority.

If you scroll down to the original message from Justin Waltz at OHA, you can see the issue and question.

I don't think there is a short, distinct, single answer to his question, so, I think a good path forward would be to have one of you respond to Justin directly.

Please respond with your interest or availability for contacting Justin Waltz at OHA. I'm sure that a contact from Region 10 would be much appreciated.

Thank you!

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**From:** Wu, Jennifer  
**Sent:** Wednesday, April 22, 2015 10:31 AM  
**To:** Peterson, Erik  
**Subject:** RE: Scientific basis for pesticide-free buffer zones

Hi Erik – I'm glad Justin's contacted you on this. Since he's working more on the effects of aerial application for residences instead of nonfish bearing strams that CZARA was focused on, I'd suggest talking with Sheila Fleming and Elizabeth Allen in OEA on this. They were/are involved with the Triangle Lake in addition to Alan, of course. But Elizabeth might have some insight into the toxicology behind this.

Come to think of it, Dirk Helder would be good as well for his information from OPP in EPA HQ since in FIFRA analyses, they consider aerial application impacts on people. I'd think they have some underlying science on this(?).

Let me know if you want more help, and I'd be happy to share the work as it's great to be supportive of Oregon's steps to introduce legislation on pesticide buffers for residences.

**From:** Peterson, Erik  
**Sent:** Tuesday, April 21, 2015 4:13 PM  
**To:** Wu, Jennifer  
**Subject:** FW: Scientific basis for pesticide-free buffer zones

Jenny,

I received the following message from Justin Waltz at Oregon Health Authority. He is involved in putting together information for the Oregon legislature in pesticide buffers for forestry.

Given your experience with CZARA, can you suggest a way to go about getting a response to Justin? For example, what group of people could I share this question with to help formulate a useful response?

I looked through the CZARA rationale and I don't think the answer is in there exactly, although, I think the work surrounding the rationale and response to comments should be valuable.

Thanks for any input on how I might go about helping Justin out.

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**From:** WALTZ Justin [<mailto:justin.waltz@state.or.us>]  
**Sent:** Thursday, April 16, 2015 11:50 AM  
**To:** Peterson, Erik

**Subject:** Scientific basis for pesticide-free buffer zones

Hi Erik –

Again, I really appreciate your time and willingness to help me out.

A discussion with my contacts at EPA's Office of Pesticide Programs reveals that there isn't any research that's been done (or is being done) at EPA on general pesticide-free buffer zones. In other words, any buffer zones required by EPA are specific to certain pesticides. When they are required, they're stated on the label ("the label is the law" ya-da ya-da).

So my specific question, which I'm hoping you can circulate as appropriate, are:

1. Is there any research (either published or on-going) which concludes anything about the minimal distance needed for a pesticide-free buffer zone between a forestry site undergoing aerial pesticide application and an adjacent or nearby residence?

[I'm asking about "general" pesticide-free buffers for residences, not those on the label of certain pesticides , as required by EPA.]

Also, here is a the Recognition and Management of Pesticide Poisoning 6<sup>th</sup> Edition, released January 2013. In particular, I draw your attention to Chapter 21 – Chronic Effects. This is the first-time this topic has been explored in this venerable book for healthcare providers. In my opinion, it's telling of EPA's sense that it's going to uncharted territory such that EPA felt the need to devote a Q&A section on that chronic effects section on the online version of this book (but not the book itself).

Anyway, any further assistance would be much appreciated.

Thanks! - JEDW

**Justin Waltz, MPH**

Program Analyst & Coordinator

PEST Program (Pesticide Exposure Safety & Tracking) & Oregon Radon Program

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